

CLAIMS

1. A method of manufacturing a bolt by pressing a bolt material against thread rolling dies for rolling, wherein

5 at least one of said thread rolling dies has a thread portion of a coarse thread formed by developing a coarse screw, and projections corresponding to a fine thread which appears cyclically on a root portion of said coarse thread at every (b) turns of said coarse thread according to a phase shift from said coarse thread when a fine screw having a helical line in the same direction as that of said coarse screw and a pitch smaller than that of said coarse
10 screw (where a ratio between the pitches of said coarse screw and said fine screw is (a) to (b); (a) and (b) are in a minimum integer ratio) is developed so that its root lies in a position higher than a root of said coarse thread.

2. A method of manufacturing a bolt by pressing a bolt material against thread
15 rolling dies for rolling, wherein

at least one of said thread rolling dies has a thread portion of a coarse thread formed by developing a coarse screw, and projections corresponding to each of fine threads which appear cyclically on a root portion of said coarse thread at every (n) turns of said coarse thread according to phase shifts from said coarse thread when one or a plurality of fine screws
20 having helical lines in the same direction as that of said coarse screw and respective different pitches smaller than that of said coarse screw (where ratios among the pitches of said coarse screw and said one or plurality of fine screws are (a) to ... to (n); (a), ..., and (n) are in minimum integer ratios) are developed, respectively (where the fine screw having a smallest pitch is developed so that its root lies in a position higher than that of a root of said coarse
25 thread).

3. The method of manufacturing a bolt according to claim 1, wherein the root of said fine screw developed is positioned higher than the root of said coarse thread by 5% to 50% a height of the fine thread according to standards.

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4. The method of manufacturing a bolt according to claim 2, wherein the root of said fine screw developed is positioned higher than the root of said coarse thread by 5% to 50% a height of the fine thread according to standards.

10 5. An apparatus for manufacturing a bolt by pressing a bolt material against thread rolling dies for rolling, wherein

at least one of said thread rolling dies has a thread portion of a coarse thread formed by developing a coarse screw, and projections corresponding to a fine thread which appears cyclically on a root portion of said coarse thread at every (b) turns of said coarse thread
15 according to a phase shift from said coarse thread when a fine screw having a helical line in the same direction as that of said coarse screw and a pitch smaller than that of said coarse screw (where the ratio between the pitches of said coarse screw and said fine screw is (a) to (b); (a) and (b) are in a minimum integer ratio) is developed so that its root lies in a position higher than a root of said coarse thread.

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6. An apparatus for manufacturing a bolt by pressing a bolt material against thread rolling dies for rolling, wherein

at least one of said thread rolling dies has a thread portion of a coarse thread formed by developing a coarse screw, and projections corresponding to each of fine threads which appear cyclically on a root portion of this coarse thread at every (n) turns of said coarse thread
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according to phase shifts from said coarse thread when one or a plurality of fine screws having helical lines in the same direction as that of said coarse screw and respective different pitches smaller than that of said coarse screw (where ratios among the pitches of said coarse screw and said one or plurality of fine screws are (a) to ... to (n); (a), ..., and (n) are in minimum integer ratios) are developed, respectively (where the fine screw having a smallest pitch is developed so that its root lies in a position higher than that of a root of said coarse thread).

7. The apparatus for manufacturing a bolt according to claim 5, wherein the
root of said fine screw developed is positioned higher than the root of said coarse thread by
5% to 50% a height of the fine thread according to standards.

8. The apparatus for manufacturing a bolt according to claim 6, wherein the
root of said fine screw developed is positioned higher than the root of said coarse thread by
5% to 50% a height of the fine thread according to standards.

9. A thread rolling die comprising: a thread portion of a coarse thread formed
by developing a coarse screw; and projections corresponding to a fine thread which appears
cyclically on a root portion of said coarse thread at every (b) turns of said coarse thread
according to a phase shift from said coarse thread when a fine screw having a helical line in
the same direction as that of said coarse screw and a pitch smaller than that of said coarse
screw (where ratio between the pitches of said coarse screw and said fine screw is (a) to (b);
(a) and (b) are in a minimum integer ratio) is developed so that its root lies in a position
higher than a root of said coarse thread.

10. A thread rolling die comprising: a thread portion of a coarse thread formed by developing a coarse screw; and projections corresponding to each of fine threads which appear cyclically on a root portion of said coarse thread at every (n) turns of said coarse thread according to phase shifts from said coarse thread when a plurality of fine screws having helical lines in the same direction as that of said coarse screw and respective different pitches smaller than that of said coarse screw (where ratios among the pitches of said coarse screw and said plurality of fine screws are (a) to ... to (n); (a), ..., and (n) are in minimum integer ratios) are developed, respectively (where the fine screw having a smallest pitch is developed so that its root lies in a position higher than that of a root of said coarse thread).
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11. The thread rolling die according to claim 9, wherein the root of said fine screw developed is positioned higher than the root of said coarse thread by 5% to 50% a height of a fine thread according to standards.
15. 12. The thread rolling die according to claim 10, wherein the root of said fine screw developed is positioned higher than the root of said coarse thread by 5% to 50% a height of a fine thread according to standards.
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13. A multiple screw bolt formed by pressing a bolt material against the thread rolling die according to claim 9 for rolling.
14. A multiple screw bolt formed by pressing a bolt material against the thread rolling die according to claim 10 for rolling.
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15. A multiple screw bolt formed by pressing a bolt material against the thread

rolling die according to claim 11 for rolling.

16. A multiple screw bolt formed by pressing a bolt material against the thread rolling die according to claim 12 for rolling.